

# Anatomy and Disorders of the Beak and Oral Cavity of Birds



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## KEYWORDS

• Avian • Beak • Cranial kinesis • Rhamphotheca • Keratin • Oral cavity

## KEY POINTS

- Cranial kinesis of the avian beak is complex, particularly in birds with prokinetic beak movement, such as parrots.
- Imaging of the avian facial and neurocranial bones can be valuable in identifying beak lesions and in planning corrective techniques. Micro-computed tomography is an emerging diagnostic modality useful for evaluation of beak disorders.
- Developmental beak deviations are common in birds and can be corrected with ramp orthotics or tension band devices.
- Any disease that affects rhamphothecal growth or abrasion (wear) can result in excessive rhamphothecal thickness or tomial elongation and necessitate periodic rhamphothecal corrective procedures.
- Many diseases of the oral cavity have similar clinical appearance, such as hypovitaminosis A, candidiasis, avian pox, trichomoniasis, and capillariasis, warranting appropriate diagnostic testing.

## INTRODUCTION

The anatomy and function of the heads and beaks of birds have some shared common features and a large number of unique adaptations specific to species groups and their unique niche functions. Similarly, disorders of the head and beak and the oral cavity also share common characteristics and some species-specific features. This article reviews anatomy, form and function, and disease conditions of the beak and the

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oral cavity, with an emphasis on those of the more commonly kept companion and aviary species.

## ANATOMY AND FUNCTION

### *General Gross Anatomic Terminology*

Anatomic and topographic terms and their synonyms for the beak are depicted in [Table 1](#). The bill, or beak, of birds is known anatomically as the rostrum. It includes the bones of the upper and lower jaws and their horny sheaths. The upper component of the bill is the maxillary rostrum (*rostrum maxillare*) and the lower component is the mandibular rostrum (*rostrum mandibulare*).<sup>1,2</sup> The upper and lower beaks of birds are covered by a hard epidermal structure derived from keratin, which covers the rostral parts of the upper and lower jaws.<sup>2</sup> Synonyms for this keratin covering are the horny bill, or rhamphotheca. Synonyms for the upper and lower horny sheaths are the maxillary rhamphotheca (or rhinotheca), and the mandibular rhamphotheca (or gnathotheca).<sup>2</sup>

### *Musculoskeletal Anatomy*

#### *Bones, joints, and cranial kinesis*

In most birds, the upper jaw functions as a rigid triangular block that can be elevated or depressed.<sup>1,3</sup> The upper jaw hinges at the flexible junction of the upper jaw with

<b>Table 1</b>	
<b>Anatomic terms and common synonyms used to describe avian beak topography</b>	
<b>Anatomic Term</b>	<b>Synonyms</b>
Rostrum	Bill or beak
Maxillary rostrum	Upper bill or beak
Mandibular rostrum	Lower bill or beak
Rhamphotheca	Keratin sheath of the beaks, horny bill
Rhinotheca	Maxillary rhamphotheca, keratin sheath of the upper bill
Gnathotheca	Mandibular rhamphotheca, keratin sheath of the lower bill
Tomium (singular), tomia (plural)	Rostral and lateral cutting edges of the rhamphotheca
Maxillary tomium, tomia	Rostral and lateral cutting edges of the maxillary rhamphotheca
Mandibular tomium, tomia	Rostral and lateral cutting edges of the mandibular rhamphotheca
<b>Midline beak profile terms</b>	
Culmen	Mid-dorsal profile of the maxillary rhamphotheca
Gonys	Mid-ventral profile of the mandibular rhamphotheca
<b>Other topographic terms</b>	
Gape	The entire opening of the mouth
Rictus	Caudal part of the oral opening, beginning at the caudal end of the tomia and ending caudally at the angle of the mouth
Inter-ramal region	Inter-ramal space, zone of soft tissue beginning at the caudal end of the gonys, extending between the mandibular rami as far as the end of the mandible
Gular region	Caudal portion of the inter-ramal space
Naris (singular), nares (plural)	Nostril and nostrils

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